

**Claims**

1. An apparatus for controlling the composition of gases within a container,  
  
5    said container including a plurality of walls, and at least one inlet and/or outlet,  
  
the apparatus including at least one sensor, at least one controller and at least one gas permeable membrane being adapted to facilitate the passage  
10    there through of different molecules at different rates,  
  
said membrane defining a first region and a second region, the first region being for holding cargo and the second region defining a gas buffer region, said at least one inlet and/or outlet being in communication with said buffer  
15    region.
2. An apparatus according to claim 1, wherein at least one of said at least one inlet and/or outlet includes a valve.
- 20    3. An apparatus according to claims 1 or 2, which includes at least two inlets and/or two outlets.
4. An apparatus according to claims 1, 2 or 3, wherein said membrane being selectively permeable.
- 25    5. An apparatus according to any of the preceding claims, wherein a valve is adapted to open when activated by the controller to provide a passage through which gases flow into and/or out of the container.

6. An apparatus according to any of the preceding claims, wherein the controller is adapted to open a valve when the concentration or volume of gas within the container reaches or falls to a specified level.

5 7. An apparatus according to any of the preceding claims, wherein the container is a building.

8. An apparatus according to claim 7 wherein the building is a cool store.

10 9. An apparatus according to any of the claims 1-8, wherein the apparatus is adapted to provide a apparatus for a transportation or shipping container, said container being substantially rectangular in shape and include two side walls, a roof, floor, rear wall and a front wall where the rear wall also doubles as a door or entrance into the interior of the container.

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10. An apparatus according to any of the preceding claims, wherein the inlet may be joined with an outlet to provide a bidirectional flow means.

11. An apparatus according to any of the preceding claims, wherein the container incorporating one bi-directional flow means located at the rear of the container and one bi-directional flow means located at the front of the container, and each of said bi-directional flow means including one valve.

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12. An apparatus according to any of the preceding claims, wherein said selectively permeable membrane being formed from a polymeric film, such as plastic, which is adapted for gas permeation.

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13. An apparatus according to claim 12, wherein said polymeric film being more permeable to carbon dioxide than to oxygen gas.

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14. An apparatus according to claims 12 or 13, wherein said polymeric film being positioned to affix to the base and roof of the container, as well as the two sidewalls of the container and thereby dividing the container into two regions, the first region being adapted as a storage compartment and being located near the front of the container, and the second being adapted as a gas buffer region being located at the rear of near the door end of the container.

15. An apparatus according to any of the claims 12, 13 or 14, wherein said polymeric film being located substantially near the rear of the container.

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16. An apparatus according to any of the claims 11 - 15, wherein said polymeric film being located to provide a void or buffering region around at least one bi-directional flow means which is adapted to control the flow of gas into the buffer region and the flow of gases out of the buffer region both into the storage compartment and completely out of the container.

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17. An apparatus according to any of the preceding claims, wherein said gas permeable film being adapted to facilitate the flow of carbon dioxide from the cargo compartment of the container to the gas buffer region of the container.

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18. An apparatus according to any of the preceding claims, wherein said gas permeable film being adapted to facilitate the flow of oxygen from the gas buffer region of the container to the storage compartment of the container.

19. An apparatus according to any of the preceding claims, wherein said gas permeable film being adapted to allow oxygen to flow through it, provided that the direction of such flow is opposite to that of the carbon dioxide.

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20. An apparatus according to any of the preceding claims, wherein a sensor located within the container being adapted to sense the concentration and/or

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volumes of carbon dioxide and/or oxygen within the cargo storage compartment of a container.

21. An apparatus according to any of the preceding claims, comprising bi-directional flow means located near the rear end of the container, said bi-directional flow means being able to open to allow gas to flow into the buffer region.

22. An apparatus according to any of the preceding claims, comprising bi-directional flow means located near the rear end of the container, said bi-directional flow means being able to open an inlet so that gas may flow into the cargo region of the container.

23. An apparatus according to any of the preceding claims, comprising bi-directional flow means located near the front end of the container, said bi-directional flow means being able to open to allow gas to flow into the buffer region.

24. A apparatus according to any of the preceding claims, comprising bi-directional flow means located near the front end of the container, said bi-directional flow means being able to open an inlet so that gas may flow into the cargo region of the container.

25. A container having a plurality of walls, and at least one inlet and/or outlet, including an apparatus for controlling the composition of gases within the container,

the apparatus including at least one sensor, at least one controller and at least one gas permeable membrane being adapted to facilitate the passage there through of different molecules at different rates,

said membrane defining a first region and a second region, the first region being for holding cargo and the second region defining a gas buffer region,

5 said at least one inlet and/or outlet being in communication with said buffer region.

26. A container according to claim 25, wherein said membrane defines a gas buffer region located inside said container.

10 27 A container according to claims 25 or 26, wherein said membrane defines a gas buffer region located on the exterior of said container.